Fuel Cell Gas-Liquid Separator

Cyclone and baffle water removal for hydrogen recirculation loops

A gas-water separator is one of the essential components of a fuel cell power system. It separates, collects and stores the liquid water carried out of the stack with the recirculated hydrogen, then discharges it through a drain valve once the level is reached. The dewatered hydrogen re-enters the circulation loop, preventing faults caused by excessive water content and raising both hydrogen utilisation and stack safety.

Gas outlet
Φ20 mm

Gas inlet
Φ20 mm barb

N_2 valve
24 VDC, 10 W

Drain valve
24 VDC, 13 W

Product description

Product type	Gas-water separator
Application	Hydrogen recirculation loop
Stack power	10 – 100 kW
Separation stages	Cyclone + baffle condensation
Body material	Aluminium alloy
Mounting	Vertical, 4 × Φ6.5 mm, M6 bolts
Mounting torque	10 ± 2 N·m

Key features

- High separation efficiency — ≥ 95 % water removal on the hydrogen circuit
- Large flow capacity up to 1200 SLPM with low pressure drop across the body
- Compact and lightweight aluminium alloy construction, easy to integrate on-board
- Automatic discharge — nitrogen discharge valve and heated drain valve both work on a timed cycle
- Wide operating window — 0 – 3.5 bar, −30 to +95 °C, with fast valve response below 30 ms
- Barb fitting interfaces for simple, leak-tight tubing installation

Product Shape





Specifications and model selection

Model selection

Circuit	Model	Application	Pressure	Max. flow	Separation	Medium temp.	Interfaces
Hydrogen circuit	FSQ-100A	10 – 100 kW	0 – 3.5 bar	1200 SLPM	≥ 95 %	−30 ~ +95 °C	Φ20 / Φ12.7
Air circuit	KFS-10	Small-power stack	0 – 3.5 bar	2000 SLPM	≥ 85 %	−40 ~ +120 °C	Φ32 / Φ38

Main body — technical parameters

Permissible gases	H_2, N_2, air and their H_2O mixtures
Pressure range	0 – 3.5 bar
Stack power rating	10 – 100 kW
Medium temperature	−30 – +95 °C
Water storage volume	≥ 40 – 80 mL
Body material	Aluminium alloy
Separation efficiency	≥ 95 %
Max. flow rate	1200 SLPM (H_2 78 / N_2 7 / H_2O 15 %)
Flow resistance	≤ 5 kPa
Ambient temperature	−30 – +95 °C, ≤ 95 %RH
Storage temperature	−30 – +95 °C
Altitude	≤ 3000 m

Valve and interface parameters

Hydrogen inlet	Φ20 mm barb fitting
Hydrogen outlet	Φ20 mm barb (customisable)
Drain outlet	Φ12.7 mm barb fitting
Exhaust outlet	Φ12.7 mm barb fitting
N_2 valve voltage	24 VDC (18 – 32 VDC)
N_2 valve power	10 W, Φ2 mm, < 30 ms
Drain valve voltage	24 VDC (18 – 32 VDC)
Drain valve power	13 W, Φ1.5 / 2.5 mm
Drain valve heating	45 W (heating type), < 30 ms
Valve connector	TE 282080-1 · MG641101-5
Solenoid connector	TE 282104-1, non-polar
Warranty	5 years body, 1 year valves

Position in the hydrogen circulation loop

The fuel cell stack (10–100 kW) outputs recirculated hydrogen mixed with water vapor. This two-phase flow enters the gas-water separator. Inside the separator, liquid water is separated from hydrogen. Dry hydrogen flows out to the hydrogen ejector for recirculation back to the stack, while separated liquid water is drained out from the bottom port.

Selection notes

Confirm the circuit

Hydrogen circuit and air circuit use different bodies and port sizes — check which side of the system the separator sits on.

Size the flow rate

Rated flow is quoted for the standard gas mix. Allow margin for start-up and purge conditions when sizing the unit.

Match the valve spec

Both discharge valves run on 24 VDC. Confirm the connector type and pin assignment against your ECU before ordering.

Why it matters
Excess water in recirculated hydrogen causes stack flooding and unstable output. Removing it before the gas re-enters the loop protects the stack and improves hydrogen utilisation.